

Reducing Hookah Use

**A Public Health Challenge
For the 21st Century**



Creating A Tobacco Free Generation



REDUCING HOOKAH USE: A PUBLIC HEALTH CHALLENGE FOR THE 21ST CENTURY

The recent global expansion of hookah use by youth and young adults to smoke tobacco poses a new challenge for the tobacco control community (American Lung Association, 2007; Maziak, Ward, et al., 2004; WHO TobReg Study Group, 2005). Currently, it is estimated that worldwide, 100 million people use a hookah (waterpipe) to smoke tobacco every day (Wolfram, et al., 2003). The past decade has seen a dramatic rise in the popularity of hookah smoking among young people living in the Middle East, Southwest Asia, Africa, Europe, Canada, and the U.S. (Maziak, Ward, et al., 2004; Knishkowsky and Amitai 2005). The growing popularity of hookah use among U.S. teens and adults is evidenced by media reports and the recent rapid proliferation of hookah establishments (bars, cafes, or restaurants) in large cities and near college campuses (Edds 2003, Gangliff 2004, McNicoll 2002, Parvaz 2005). Hookahs and the tobacco mix used to smoke them are easily available. Young smokers can rent hookahs for an hourly rate of between \$10 and \$20 at hookah establishments or buy them for as little as \$14 or as much as \$200 or more, and buy the tobacco mix for about \$7.00 a packet (Hillery, 2005; Kozlowski, 2006; Parvaz, 2005).

Teens and young adults are susceptible to hookah use because of their tendency to experiment with new things. In the U.S., young people already have the highest rates of cigarette smoking of all age groups (Centers for Disease Control and Prevention [CDC], 2006a, 2006b). As CDC reports, in 2005, 24% of adults aged 18 to 24 and 23% of high-school students smoked cigarettes. If they start smoking tobacco at an early age they are more likely to become addicted to nicotine than those who start later and those using hookahs may well transition to cigarettes as their addiction becomes stronger (Hill-Rice, et al., 2003; Primrack, Aronson, and Agarwal, 2006). Also, the tobacco industry may see the growing popularity of hookah use as another opportunity to target a population that has already provided them with a valuable market for their current products (Primrack, Aronson, and Agarwal, 2006).

The BACCHUS Network™ (BACCHUS) is taking a lead role in addressing hookah use among teens and young adults in the U.S. For years, BACCHUS has provided substantial support for campus tobacco control and other health promotion programs nationwide and overseas. In an effort to learn more about hookah smoking and how best to address this public health challenge, BACCHUS has collected, analyzed, and synthesized information from two sources:

- * An in-depth review of the literature on hookah issues including research, media articles, websites and other information sources from the Middle East, the U.S., and other countries, and
- * A small survey of local and national tobacco control advocates, officials, and health educators working on campuses, in public health departments, and other settings in Colorado, California, Nevada, New York, and other States across the country to learn about their needs, experiences, and actions taken to reduce hookah use. A total of 12 persons were interviewed for this study.¹

¹ Organizations represented by survey participants include city and county health departments, a state department of revenue (enforcement), university or college health promotions departments, a student health center, and the following tobacco control advocacy organizations: Get RIEAL Colorado, Breathe California, Americans for Nonsmokers Rights, and the American Legacy Foundation.

This report summarizes the results and conclusions of these investigations to raise awareness about the potential health threat of hookah use among youth and young adults, to correct misperceptions about its alleged safety, and to recommend strategies to curtail its use. It aims to assist health educators, students, health professionals and others engaged in tobacco control by providing useful information, resources and some suggestions on how best to respond if hookah use becomes a problem in their communities. The report may also be useful for educators, college and university officials and faculty, parents and young adults.

Most studies cited in this report are from Egypt, Israel, Lebanon, and Syria, where most of work on hookahs has been done, while the main sources of information for U.S. are from media reports, the Internet, and BACCHUS survey participants.

BACKGROUND, HISTORY, AND PREVALENCE

What Hookahs Are and How They Work. They come in a variety of designs, sizes, materials and colors, but typical hookahs have the following components (Knishkowsky and Amitai, 2005; Maziak, Ward, et al., 2004):

- * A bowl where the tobacco is placed and heated, usually with burning embers or charcoal
- * A vase or smoke chamber which is partially filled with water,
- * A pipe or stem connecting the bowl to the vase by a tube that carries the smoke down into the water, and
- * A hose with a mouthpiece through which the smoke is drawn from the vase.

As the smoker inhales, the tobacco smoke is sucked down from the bowl and then bubbles up through the water into the air of the smoke chamber and then through the hose to the smoker. The water in the vase cools the smoke and filters out some of its tar and particulates. At the end of a smoking session, the dirty water is thrown away and the hookah vase refilled for the next user or users (Asotra, 2006). Most smoking sessions last from 45 to 60 minutes but they can continue for several hours (Knishkowsky and Amitai, 2005).

While hookah is the most common word used among English speakers, other terms used include narghile or nargile, goza, ghalyun, and hubble bubble (Maziak, Ward, et al., 2004; Radwan, et al., 2003; Shafagoj and Mohammed, 2003; Zahran, et al., 1985). Hookahs are made with single hoses or three or more of them connected to the base for multiple users. Hookahs are made with a variety of materials and come in a variety of colors. Many of them have been made into works of art by skilled craftsmen in India, Iran, Turkey, and the Middle East (Knishkowsky and Amitai, 2005; Prokoroff, et al., 2006).



Hookah History and Culture. Hookah smoking may have originated in India and then spread to Persia, Afghanistan, the Middle East, Turkey, and Africa (Chattopadhyay, 2000; Maziak, Ward, et al., 2004; Wolfram, et al., 2003). Hookahs were first used to smoke opium or hashish, but during the late 16th and early 17th centuries, they became much more popular with the introduction of tobacco from America and the opening of multiple public coffee houses (Chaouachi, 2006). Hookahs became a central feature of coffee house culture with users spending hours with friends in cafes smoking, drinking mint tea or coffee, and/or playing chess, dominoes, or backgammon.

Over the years, hookahs became embedded in the traditional cultures of Turkey, the Middle East, Iran, Afghanistan, India and parts of Africa. Hookah use was a ceremonial activity governed by strict rules for each stage in the process of preparing, lighting, and smoking (Kinzer, 1997). Refusal to share your hookah with a guest was considered a grave insult (Kinzer, 1997). Most Middle Eastern hookah smokers were adult males and older females, but hookahs also became popular among upper-class Turkish women who offered them to guests with afternoon tea and at intellectual gatherings (Al-Belasy, 2006; Kinzer, 1997).

During the past century hookah use declined as cigarettes became more widely available. Most hookah smokers were elderly and retired men who congregated in bazaar cafes in poor neighborhoods (Kandela, 2000; Kinzer, 1997; Knishkowsky and Amitai 2005). Since the 1990s, however, hookah use has rapidly expanded, spreading from the Middle East to other parts of the world including the U.S. (Maziak, et al., 2004).

Prevalence. Most of the data on hookah use prevalence are from Middle Eastern studies. Results from a representative sample of these studies indicate that

- * 19% of 635 young Egyptian teenagers had used hookahs (Gadall, et al., 2003).
- * 41% of 388 Israeli schoolchildren aged 12 to 18 years smoked hookahs, and 22% of these users smoked every weekend (Varsano, et al., 2003b).
- * Of 587 Syrian university students, 63% of the men and 30% of the women had ever used hookahs: currently, 26% of the men and 5% of the women still used them (Maziak, Fouad, et al., 2004).
- * Among 1964 Lebanese university students in a 2001 survey, 31% of the men and 23% of the women used hookahs weekly (Tamim, Terro, et al., 2003).
- * 57% of men and 69% of women in a national survey of 4,000 Kuwaiti government workers had used hookahs at least once (Memon, et al., 2000).
- * The percentage of American University of Beirut students who had ever used a hookah rose from 30% in 1998 to 43% in 2002 (Chaaya, El Roueiheb, et al., 2004).

Prevalence data on hookah use in the U.S. are limited to a survey of 1671 teens (mostly Arab-American) aged 14 to 18 years and living in Michigan (Hill-Rice, 2003). Among study participants, 27% had used hookahs and the percentage of users increased from 23% at age 14 to 40% at age 18 (Hill-Rice, et al. 2003). Hookah users were twice as likely as non-users to be smoking cigarettes as well and that the odds of experimenting with cigarettes were eight times as high for anyone who had ever used a hookah as for non-users. In this country, the use of hookahs has become increasingly widespread with the growing numbers of Arab immigrants and Arab-Americans and increasingly popular among youth and young adults in the general population (O'Malley, 2000; Miller, 2005).

Two surveys of 300 students each conducted in 2005 and 2006 by Breathe California, Sacramento, found that during the first year, 45% of the students had used hookahs during the past two months. In 2006, 40% of the students were at events where hookahs were used and of these, 58% used hookahs during the past 6 months.

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4 In the Spring of 2007, campus professionals and national young adult tobacco control experts were interviewed about their perception of hookah use and youth and young adults. Most interview participants reported growing numbers of middle school, high school, and college students smoking with hookahs in their communities and across the country. Also reported were a proliferation of hookah bars and growing numbers of students smoking hookahs with friends inside or outside their residence halls, in their apartments or houses. Hookahs have become a common topic of conversation among students.

Expanding hookah use has also been reported by the media. Examples from the U.S. include “Hooked on hookahs: teen’s waterpipe use raises health worries” (Kozlowski, The Detroit News, 2006); “Healthy or not, the hookah habit is hot” among UCLA students (Berestein, Time Magazine, 2003), and “Collegians smoking hookahs...filled with tobacco.” (Lewin, the New York Times, 2006).

WHY HOOKAHS HAVE BECOME SO POPULAR

Major reasons for the growing popularity of hookah use worldwide since the 1990s include the introduction of a flavored tobacco mix, the mushrooming of hookah establishments, aggressive marketing, and media hype about this new trend.

Introduction of Flavored Tobacco. In the early 1990s, Egyptian tobacco companies introduced “Maassel”, a specially prepared mixture containing sweetened fruit flavors and mild aromatic smoke which has helped to attract new hookah users worldwide (Primack, Aronson, and Agarwal, 2006; Maziak, Ward, Afifi Soweid, and Eissenberg, 2004; Parvaz, 2005; Rastam, et al., 2004). Maassel, known as “shisha” in the U.S., consists of about 30% of crude cut tobacco fermented with about 70% of honey, molasses, and the pulp of different fruits. It provides a pleasant aroma when heated slowly with burning charcoal and comes in a variety of flavors including apple, strawberry, rose, mango, cappuccino, banana, peach, lemon, orange, mint, and licorice (Maziak, Fouad, Hammal, et al, 2004). Currently, most hookah smokers around the world use Maassel rather than the traditional tobacco mix because it is more flavorful and makes the process of waterpipe preparation simpler because users do not need to moisten, shape, and dry the tobacco before use, as with other kinds of tobacco like Ajami (Maziak, Ward, et al., 2004; Rastam, et al., 2004).

Hookah Bars, Cafes, and Restaurants. Hookah bars, cafes, and restaurants have become popular social gathering places for young smokers and their friends and their numbers have increased dramatically in recent years. In the U.S., the estimated number of these establishments now ranges from 300 to 1,000 (Asotra 2005; Koch, 2005). Directories listing hookah bars and cafes in large cities and the States are posted on the Internet and these places are touted in the media, e.g., “Hookah bars and lounges enjoy a blaze of popularity, Edds, Washington Post, 2003; “Passing the Pipe, Middle Eastern-style is catching on in Seattle) Parvaz, Seattle Post; “Up in smoke”, Hillery, Arizona Daily Wildcat, 2005). BACCHUS survey participants reported large increases in the numbers of hookah establishments in their communities during the past several years, e.g., from 2 to 25 in Denver, from 0 to 4 in Fort Collins, Colorado, and from 0 to 7 in Sacramento.

Hookah bars, cafes, and restaurants lure customers through advertising in college/university and local newspapers, radio stations popular among young people, and by emphasizing exotic aspects of Middle Eastern culture in their décor, furnishings, music, and displays of a variety of colorful, finely crafted hookahs (Edds, 2003; Maurer, 2006; Parvaz, 2005).

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Aggressive Marketing. Multiple enterprises have sprung up in the U.S. and Middle East to take advantage of a booming business fueled by aggressive marketing of hookahs, hookah accessories, and Maassel. For example, in Bahrain, revenues from hookah tobacco exports to other Middle-Eastern countries increased by 9% to about \$25 million from 1995 to 1996 (Kandela, 1997). Most of the “shisha” imported to the U.S. comes from companies in the United Arab Emirates, Jordan, Egypt and Saudi Arabia (Kugiya, 2006). The owner of the Florida-based website SouthSmoke.com recently reported that the demand for hookahs was at an all-time high and that sales were highest in California, Arizona, New York, Texas, and Virginia (Kugiya 2006). A Detroit wholesaler also made more than \$1 million in sales the previous year to tobacco shops, hookah cafes and stores across the country and predicted that sales would triple in the coming year (Kozlowski, 2006).

Many businesses have developed websites to advertise their hookah products, e.g., Southsmoke.com, hookahkings.com, hookah-hookah.com, fumari.com, and egyptiandreams.co.uk. To attract customers, these businesses offer a variety of hookahs for sale, e.g., Egyptian Hookahs, Sheik Hookahs, Rotating Hookahs, and Modern Hookahs or give these products exotic names like “Scheherazade,” “Syrian Queen,” and “Queen Nefertiti.” Fumari claims that its hookahs and shisha “... deliver a pure experience,” and are “made for durability.” Other websites promote hookah use as chic and elegant (hookahculture.com) or as part of a unique lifestyle (insidehookah.com) and hookahs as objects of religious veneration (sacrednarghile.com).

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Media Hype. The media (radio, satellite TV, and the press) has also helped to boost the global expansion of hookah use by glamorizing this practice. U.S. newspaper reporters depict hookah use as new, trendy, and safe for college students and other young people, although some of them do warn about its potential health effects (e.g., Briggs, 2005; Edds, 2003; Hillery, 2005; Koch, 2005; Kozlowski, 2006; Parvaz, 2005; Spear, 2005.) Most of the BACCHUS survey participants reported reading articles in campus and local newspapers promoting hookah use. For example, one article in the Colorado State University’s Rocky Mountain Collegian (Patel 2006) reports that when a student first walked into King Tut’s hookah bar she was “instantly hooked.” Also, an editorial in this paper, praised the Fort Collins city council for granting local hookah bars exemptions from the local ordinance prohibiting smoking in public places (Editorial Staff, 2005).

Assessing the specific dangers of hookah use is challenging because some users also smoke cigarettes; the extent to which it is harmful likely depends on the duration and frequency of use, and there is wide variation in the content of the different brands of hookah tobacco (Chaouachi, 2006; Hadidi and Mohammed, 2004).

Constituents of Hookah Smoke. Despite these challenges, studies provide ample evidence that hookah smoking is not a safe alternative to cigarette smoking. Hookah smoke has been found to contain high concentrations of carbon monoxide (CO), nicotine, “tar”, and heavy metals (Kiter, et al., 2000; Knishkowsky and Amitai, 2004; Shafagoj, Mohammed, Hadidi, 2002; Shihadeh 2003, Shihadeh, et al., 2004). Also, commonly used heat sources like charcoal or wood cinders may increase health risks because they produce such toxicants as CO, metals, and carcinogens (Shihadeh, 2003; Shihadeh, and Saleh, 2005). These risks may be increased by using quick-burning charcoal which likely emits more CO than the charcoal traditionally used in the Middle East.

Health Effects. Health problems identified by researchers in the Middle East, China, and India include lung, oral and bladder cancer, and cancer of the esophagus and stomach (Bedwani, et al., 1997; El-Hakim and Uthman 1999; Gunaid, et al., 1995; Gupta, et al., 2001, Lubin, et al., 1992); heart disease (Jabbour, El-Roueibeh and Sibai, 2003); and respiratory problems (Kiter, et al., 2000). Other health risks include nicotine dependence (Shihadeh, et al., 2004) and infections like tuberculosis, herpes, and hepatitis which can be transmitted through the sharing of the same mouthpiece — a common custom in many cultures (Chaaya, Jabbour, et al., 2004). BACCHUS survey participants expressed concern that hookah use by teens and young adults would serve as a gateway to cigarette smoking in later years. Two participants also reported an outbreak of mononucleosis in Denver among young hookah bar customers who had shared mouthpieces. They noted that hookah bars are not required to sterilize or replace these mouthpieces after use.

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Health Risks for Children. Women using hookahs during pregnancy may expose their unborn children to low birth weight, low Apgar scores and respiratory distress (Nuwayhid, et al., 1998). Children exposed to secondhand smoke (SHS) from hookahs at home may suffer from respiratory ailments and also from similar problems as children whose families smoke cigarettes, e.g., ear and upper respiratory infection, asthma and sudden infant death syndrome (DiFranza and Lew, 1996; Tamim, Musharrafieh, et al., 2003).

AWARENESS, ATTITUDES AND MISPERCEPTIONS

Lack of public knowledge about these potential health hazards has led to the widespread misperception that hookah smoking is safe. Studies conducted in Egypt, Israel, and Syria have found that in general, people know little about its health effects and believe that it is less harmful than cigarette smoking (Varsano, et al., 2003; Maziak, Fouad, et al, 2004; Israel, et al., 2003; Ward, Eissenberg, Rastam, et al., 2006). Another study of 576 pregnant women in Beirut and its suburbs found that 25% had smoked hookahs during their pregnancies (Chaaya, Awwad, et al, 2003), which suggests that these participants may not have known about the harmful fetal effects of their behavior (Nuwayhid, et al.1998).

Another common misperception among hookah users is that they will not suffer any adverse consequences if they smoke occasionally rather than daily like most cigarette smokers (Asfar, et al., 2005; Chaaya, et al., 2004; Israel, El-Setouhy, et al., Koch 2005; Lewin 2006; Putnam, 2001; Ward, et al., 2006.) Yet even occasional users could be harmed because they probably inhale a lot of smoke full of toxic substances during smoking sessions that typically last for 45 minutes to over an hour (Hadidi and Mohammed, 2004; Shihadeh and Saleh, 2005).

Lack of knowledge, attitudes, and misperceptions about hookah use among college students and other young people was a major concern for BACCHUS survey participants. One reported that the students she works with are strong advocates for tobacco control when it comes to cigarettes but had smoked with hookahs and didn't think it was a "big deal."

A lack of awareness about the dangers of hookahs may also help to explain permissive attitudes toward teen children and/or young women using them in some parts of the Middle East. For example, in several Eastern Mediterranean countries, researchers found cases of teenage children being allowed to

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smoke with hookahs, of some families even sharing a hookah after meals, and of a greater tolerance of women using these water pipes than smoking cigarettes (Kinishkowsky and Amitai, 2005; Maziak, Rastam, et al., 2004; Tamim, Terro, et al., 2003).

In the U.S., hookah use is promoted by much of the media, hookah retailers, and hookah bars/cafes as an enjoyable and safe social activity for college students and other young users. Some college students prefer hookah smoking over other kinds of recreation because it offers a cheaper and safer alternative to taking drugs or bar-hopping and the potential problems associated with these activities (Hillery 2005; Lewin 2006). One BACCHUS survey participant reported that parents in Larimer County, Colorado, tend to view hookah bars as safe venues for their 18-year-olds as compared to regular bars. They and other community members are more worried about rising rates of illicit drug use than about hookahs.

POLICY STRATEGIES, ISSUES, AND CHALLENGES

Policies banning smoking in public places may help to prevent and reduce hookah smoking because hookah users tend to be social smokers and like to smoke with friends in bars, cafes, and other public places (Philpot, et al., 1999). Some countries like Ireland, Norway, and Sweden have recently passed clean indoor air laws (Tobacco Public Policy Center, 2007). In the U.S. 22 States and the District of Columbia have clean air laws, with 13 of them banning smoking in almost all public places and workplaces (American Lung Association, 2007; Tobacco Public Policy Center, 2007). In most of these States, however, clean air laws have not prevented hookah bars from operating because they can claim that they are "retail tobacco establishments" or "tobacco bars/cigar lounges." Hookah bars can operate as retail tobacco establishments if the bulk of their revenue comes from sales of tobacco products, or as tobacco bars or cigar lounges if they are engaged primarily in selling tobacco products for consumption by customers on the premises. New York City has exempted Middle Eastern hookah bars from its ban against indoor smoking because they are defined as "tobacco bars" (Washington Times, 2004, Dana Young, 2003). In Columbus, Ohio, several hookah lounges stopped serving food to comply with the statewide ban on smoking in restaurants and other places that serve food (Narciso, 2006).

Survey participants reported that despite state or local clean air laws, hookah bars continue to operate in Colorado and Nevada, as well as in New York City, Fort Collins and Durango, Colorado, and Athens, Ohio. California hookah bars have evaded the state law against indoor smoking by setting up their waterpipes outside. Despite vigorous efforts by two participants and other tobacco control advocates in Fort Collins, the city council exempted the local hookah bars from the clean air ordinance as long as only 20% of their floor space was used for hookah smoking and 70-80% of their sales were for tobacco products.

Regulation of the content of “shisha” has been recommended as another viable policy strategy to address hookah use in the U.S. but the wide variety of tobacco mixes sold by different producers makes this a difficult task to accomplish. For example, two researchers

(Hadidi and Mohammed, 2004) found wide variation in the nicotine content of 13 commercial brands of hookah tobacco. One survey participant noted that hookah bars usually mix up their own “concoctions” and tout their shisha as containing very little or no tobacco, tar, or nicotine. Breathe California sent some packets of these mixtures from several hookah bars to a lab for testing and found that these claims were false.

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Data from the literature and BACCHUS survey respondents clearly indicate a need for policies to ensure that hookah bars uphold the law against tobacco use by minors but these establishments often fail to check their customers’ I.D.’s. One survey participant from Colorado described the difficulty of enforcing the law prohibiting minors from purchasing or using tobacco products at hookah bars. It is difficult to distinguish minors from older customers and to determine whether the mixture they are smoking contains tobacco. Often the mixture is already in the pipe and being smoked and the bars are full of smoke. Since having tobacco is not a crime for underage children in this State, enforcement officers can only intervene if they see minors buying tobacco at hookah bars; they then have to write up a summons for the salesperson. In California, however, minors can be cited if they are caught purchasing or using tobacco.

CONCLUSIONS AND RECOMMENDATIONS

Hookahs have been used for at least 400 years to smoke tobacco but their recent popularity among teens and young adults in the U.S., the Middle East, Europe and other parts of the world represents a global public health challenge (Jabbour, 2003; WHO TobReg Study Group, 2005). Major reasons for this trend include the introduction of flavored tobacco (Maassel), the rapid rise in the number of hookah establishments, aggressive marketing tactics by businesses, and newspaper articles and other media touting hookah smoking as fashionable, trendy, and safe. Although studies have identified serious health problems associated with hookah use and exposure to its secondhand smoke, most people seem to be unaware of these dangers. Hookah use is widely viewed as a safe alternative to cigarette smoking rather than a potential health hazard. In fact, for young people, hookah use may represent initial stage of later addiction and the transition to cigarettes (Primrack, Aronson, and Agarwal, 2006).

Clean indoor air legislation has been passed in several countries and a number of States in the U.S. In this country, however, hookah bars have managed to get exemptions from these laws in most of the States. These establishments not only continue to operate, but new ones literally “spring up overnight” in large cities and near college campuses.

Their mode of operations compounds the problems associated with hookah use. Since hookah bar owners tend not to ask their young customers for any identification, they often end up serving minors. Also, they make up their own concoctions to smoke with the hookahs they rent. Since Maassel is not regulated like cigarette tobacco, hookah bar owners can claim their mixtures contain little or no tar or nicotine or are tobacco free. Breathe California had some of the mixtures made up by Sacramento hookah bars tested in a lab and found that they did indeed contain tobacco. Also, hookah bar owners are not required to sterilize or replace the mouthpieces of their hookahs, thus exposing customers to the risk of contracting infectious diseases from sharing hookahs with others.

To address these challenges, the following recommendations have been drawn from the literature and BACCHUS survey participants:

Conduct more research on hookah smoking among youth and young adults in the U.S. and other countries where hookah use is rapidly rising.

Additional research on hookah use will provide the scientific basis for assessing the magnitude of this health problem, convincing users and others that it is not safe, and developing prevention, cessation, and policy strategies that will stop it from becoming a global epidemic (Knishkowsky and Amitai, 2005; Maziak, Ward, et al., 2004; WHO TobReg Study Group, 2005).

Future studies should be conducted to:

- * Collect ongoing prevalence data each year on hookah use prevalence among youth and young adults to assess trends over time to assess the magnitude of the problem.
- * Identify and describe knowledge, attitudes, and perceptions about hookah use and its perceived safety as compared to cigarette smoking to learn why young people smoke hookahs.
- * Monitor key marketing strategies to provide the basis for counter-marketing efforts.
- * Assess the health risks of hookah smoke and smoking to build on the knowledge gained from the research already conducted in the Middle East and other parts of the world.
- * Facilitate the development, implementation, and evaluation of cessation products and programs to help users to quit.

Surveys have been developed to collect prevalence and other data, e.g., a nationwide campus survey by the American Legacy Foundation’s Youth Activism Council on hookah use, knowledge, and attitudes. However, questions on hookah issues can also be added to existing surveys. For example, a question on hookah use during the past 30 days was added to the National College Health Assessment survey conducted with 1,500-1,000 CalState students in March 2007. BACCHUS has added a question on hookah use to its annual Tobacco Use and Attitude Surveys conducted at all participating campuses in the Colorado Collegiate Tobacco Prevention Initiative grant program. National prevalence data would be available if questions could be added to such annual surveys as the Youth Tobacco Survey and Behavioral Risk Factor Surveillance System.

More health education campaigns and materials are urgently needed to raise public awareness of the health risks of hookah use and dispel the myth that it is safe. Educational programs are especially important for middle-, high-school, and college students as well as for their parents, health professionals, pregnant women, and people who are exposed to SHS from hookahs. Others who need to know more about the health risks of hookahs include the administrators, staff, and faculty of schools, colleges, and universities as well as public health officials and policymakers.

Suggestions from BACCHUS survey participants for educational activities, programs and/or materials were to:

- * Use peer educators to conduct classroom and other kinds of presentations because the peer-to-peer model (used by Breathe California and promoted by BACCHUS) is more effective than using older adults for these activities.
- * Engage students and other young people in the conversation, encouraging them to identify the risks of hookah use and healthy alternatives.¹
- * Collaborate with students on hookah use prevention campaigns, for example, Breathe California staff and students have constructed a huge hookah and bulletin board highlighting its health risks and correcting myths about its safety and are taking them around the campuses in the Sacramento area.
- * Include information about hookah use in health promotion presentations.
- * Present information on hookah-related health risks to staff at student health centers and assist them in adopting the practice of asking their patients about hookah use, educating them on the risks, and encouraging users to quit.
- * Conduct more presentations on hookah issues at local and national conferences.
- * Make use of the media, e.g., writing articles or letters to the editor and placing ads in campus and local newspapers to “spread the message.”

Mobilize to change or strengthen policies to reduce hookah use and its harmful effects.

Many countries and a number of States in the U.S. need policies to eliminate exposure to secondhand smoke. However, hookah bars can continue to operate in at least 16 of the 22 States and the District of Columbia that have clean indoor air legislation by claiming that they are retail tobacco establishments or operate as tobacco/cigar bars or lounges (American Lung Association, 2007; Tobacco Public Policy Center, 2007). Tobacco control advocates and others need to mobilize to close these loopholes by educating policymakers on the health risks of hookah use and urging them to change the law. Two survey participants reported that although they did not succeed in convincing the Fort Collins city council to make the local smoke-free ordinance apply to the hookah bars, they were successful in two important ways. They got the council to restrict smoking at new hookah bars to 10% of their floor space and they have mobilized widespread community support for future tobacco control initiatives. Another participant who works for Americans for Nonsmokers' Rights is assisting Ohio and other States to close the legislative loopholes that allow hookah bars to continue operations.

¹One important research question is whether and to what extent smokers evolve from intermittent use to addiction, and from hookahs to cigarettes.

Other policies that would reduce the harmful effects of hookah smoking include requiring hookah bars to ask all customers for their I.D.'s to prevent minors from buying or smoking tobacco on their premises and ensuring that they provide plastic, disposable mouthpieces or nozzles to prevent the transmittal of infections among users sharing the same waterpipe.

Also, policies to reduce cigarette smoking may also prove effective in curtailing the use of hookahs (Israel, et al., 2003; Knishkowsky and Amitai, 2005; WHO TobReg Study Group, 2005; Wewers and Uno, 2002). These policies include imposing marketing restrictions, prohibiting misleading labeling (e.g., contains 0 mg of tar), placing warning labels about health risks on the products, and regulating the tobacco content of Maassel. Taxation of this tobacco mix may also reduce the appeal of hookah smoking for young people.

Collaborate with others to share experiences, information, and resources.

Several survey participants emphasized the need for greater inter-organizational collaboration across the country linking local and national groups working in tobacco control. Collaboration would enable individual groups to better address hookah use shared information, tips, resources, and key lessons learned; as one participant noted: “We would not have to reinvent the wheel.”

Finally, policies and other strategies to reduce rates of hookah smoking will have a greater chance of success if they are based on scientific research, take account of the unique social context of this practice, and respect its long cultural tradition in India, the Middle East, and Africa (Chaouachi, 2006; Poland, Frohlich, and Haines, 2006; Maziak, Ward, et al., 2004). Programs that are culturally appropriate and engage the target populations—especially teens and young adults, their parents, and communities—may ultimately prove to be the most successful approach in combating this emerging global epidemic.

American Lung Association (February 2007). Tobacco Policy Trend Alert: An Emerging Deadly Trend: Waterpipe Tobacco Use. Warns about the health effects of hookah use and includes a list of States with Clean Air laws for public places and workplaces, and which ones have exemptions for hookah bars. (www.lunguse.org)

An article by Kamlesh Asotra highlights the appeal and health risks of hookah use “What you don’t know can kill you: the latest on hookahs.” The article has been reprinted, with the author’s permission, in the February/March 2006 edition of Peer Educator, a BACCHUS Network publication. (www.tobaccofreeU.org/colorado)

BACCHUS Network™ *Don’t Get Hooked on Hookahs*. This pamphlet warns current or potential users not to get addicted. Despite their popularity, hookahs still involve tobacco, nicotine and smoker and therefore are dangerous. (www.tobaccofreeU.org/colorado)

Breathe California in Sacramento has developed a colorful postcard size educational handout and 8½” x 11” poster entitled “Hooked on Hookah” that are widely distributed on campuses in this area. These materials highlight the health hazards of hookah smoking, and correct myths about its safety. Visit (www.breathecalifornia.org)

The Tobacco Public Policy Center has developed a fact sheet *Hookah Bars and Clean Indoor Air Laws* which includes suggested strategies to ensure hookah bars comply with clean indoor air ordinances and offering assistance in drafting comprehensive clean air ordinances or ordinances requiring warnings about the harmful effects of hookah smoking. The Center can be contacted at tobacco@law.capital.edu or (www.law.capital.edu)

REFERENCES

Al-Belasy FA. (2004). The relationship of “shisha” (waterpipe) smoking to postextraction dry socket. *Journal of Oral Maxillofac Surgery* 62:10-14.

Al-Belasy FA. (2006) A personal experience with Goza and Shisha smoking. *Tobacco Control* (Letter to the Editor in response to Ward, et al., 2006: The tobacco epidemic in Syria. *Tobacco Control* 15:24-29.)

American Lung Association (February 2007). *Tobacco Policy Trend Alert: An Emerging Deadly Trend: Waterpipe Tobacco Use*.

Al-Fayez SF, Salleh M, Ardawi M, et al. (1988). Effects of sheesha and cigarette smoking on pulmonary function of Saudi males and females. *Tropical Geographic Medicine* 40:114-23.

Asfar T, Ward KD, Eissenberg T, and Maziak W. (2005). Comparison of patterns of use, beliefs, and attitudes related to waterpipe between beginning and established smokers. *BMC Public Health* (5) (www.pubmedcentral.nih.gov/articlerender.fcgi?artid=553967)

- Ashmawi M. (1993). Some predictive markers of arteriosclerosis among smokers. *Ain Shams Medical Journal* 44:633-39.
- Asotra K. (2006). Hooked on Hookah? What you don't know can kill you. *The Peer Educator* 29(4) (Reprinted with author's permission from the August 2005 article in Burning Issues: Tobacco Related Disease Research Program Newsletter). Denver, Co: The BACCHUS Network™.
- Bayindir U, Ucan ES, Sercin B, and Ikiz F. (1993). The effect of water-pipe smoking on the peak flow rate. *European Respiratory Journal* 6(suppl. 17): 608.
- Bedwani R, el-Khwsy F, Renganathan E, et al. (1997). Epidemiology of bladder cancer in Alexandria, Egypt: tobacco smoking. *International Journal of Cancer* 73:64-67.
- Berestein L. (2003). Healthy or not, the hookah habit is hot. *Time Magazine*, January 27.
- Bhide M. (2005). Local hookah bars. *Washington Post*, September 25.
- Bowers M. (2006). Smoke alarm over hookahs at Virginia Wesleyan. *The Virginian-Pilot*, Nov. 2.
- Breathe California Sacramento. *Hooked on Hookah*. Educational postcard handout and poster developed under Agreement #05-45859 with the California Department of Health Services, Tobacco Control Section.
- Briggs C. (2005). Teen smoking fad stems from tradition. *Silver Chips (Montgomery Blair High School, Silver Spring, MD)* June 3.
- Business Day. (2003). Thailand to ban fashionable hookahs. July 16.
- Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion (CDC/NCCDPHP). Prevalence Data: Tobacco Use – 2005. Behavioral Risk Factor Surveillance System (BRFSS). (<http://apps.nccd.cdc.gov/brfss>)
- CDC/NCCDPHP. (2006). Youth and tobacco use: current estimates. *Tobacco Information and Prevention Source (TIPS)*, July. (www.cdc.gov/tobacco/research_data/youth?Youth_Factsheet.htm)
- Centers for Disease Control and Prevention. (1994). Preventing tobacco use among young people: a report of the surgeon general. Executive Summary. *Morbidity Mortality Weekly Report* 43:1-10.
- Centers for Disease Control and Prevention. (2006a). Tobacco Use among Adults – United States, 2005. *MMRW* 55(42): 1145-1148.
- Centers for Disease Control and Prevention. (2006b). Cigarette use among high school students – United States, 1991-2005. *MMRW* 55(26): 724-726.
- Centers for Disease Control and Prevention: National Center for Chronic Disease Prevention and Health Promotion. (2006c). Prevalence Data: Tobacco Use – 2005. *Behavioral Risk Factor Surveillance System*, Atlanta, GA: National Center for Chronic Disease Prevention and Health Promotion (<http://apps/nccd/cdc.gov/brfss>).

Chaaya M, Awwad J, Campbell OM, et al. (2003) Demographic and psychosocial profile of smoking among pregnant women in Lebanon: public health implications. *Maternal Child Health Journal* 7:179-86.

Chaaya, M., El Roueiheb Z, Chemaitelly H, et al. (2004) Argileh smoking among university students: a new tobacco epidemic. *Nicotine Tobacco Research* 6:457-63.

Chaaya M, Jabbour S, El-Roueiheb Z, and Chameitelly H. (2004). Knowledge, Attitudes, and practices of argileh (waterpipe or hubble-bubble) and cigarette smoking among pregnant women in Lebanon. *Addictive Behaviors* 29(9): 1821-1831.

Chaaya M, El-Roueiheb Z, Chemaitelly H, Azar G, Nasr J, Al-Sahab B. (2004b). Argileh smoking among university students: a new tobacco epidemic. *Nicotine and Tobacco Research* 6:457-63.

Chacon C. (2006). R-Generation: through the smoke: hookah: a billowing trend. *Las Vegas Review-Journal*, December 19.

Chaouachi K. (2004). Shisha, hookah. Le narguile aux XXle siecle. Bref etat des connaissances scientifiques. *Le Courrier des Addictions* 6(4):150-52.

Chaouachi K. (2006). A critique of the WHO TobReg's "Advisory Not" report entitled: Waterpipe tobacco smoking: health effects, research needs and recommended actions by regulators." *Journal of Negative Results in BioMedicine* 5:17-27. (www.jnrnm.com/content/5/1/17)

Chaouachi K. (2006). Syria, Lebanon, Tobacco research in general and harghile (hookah, shisha) smoking in particular. *Tobacco Control Online e-letter*, June 8.

Chaouachi K. (2006). The Social Context of Individual and Collective Smoking: Similarities and Differences. *Tobacco Control Online e-letter*, April 1. A critical analysis of the following study: Poland B, Frohlich K, Haines RJ, Mykhalovskiy E, Rock M. Sparks R. (2006). The social context of smoking: the next frontier in tobacco control?. *Tobacco Control* 15:59-63. <http://tc.bmjournals.com/cgi/eletters/15/1/59>

Chattopadhyay A. Emperor Akhar as a healer and his eminent physicians. (2000). *Bulletin of the Indian Institute for the History of Medicine, Hyderabad* 30(2):151-57.

Collingham, L. (2006). *Curry: A Tale of Cooks and Conquerors*. Oxford, UK and New York: Oxford University Press.

Dangremond S. (2007). A more-social cloud of smoke: Outside of dorms and in bars, hookah smoking gains a following. *Daily Pennsylvanian*, Philadelphia: University of Pennsylvania, January 26.

DiFranza JR and Lew RA. (1996). Morbidity and mortality in children associated with the use of tobacco products by other people. *Pediatrics* 97:560-568.

The Economist. (2001). Happy hookahs. *The Economist*, May 3.

Edds K. (2003). Hookah bars and lounges enjoy a blaze of popularity. *Washington Post* April 23.

Editorial Staff. (2005). Our View. *The Rocky Mountain Collegian*. December 5.

El-Hakim IE and Uthman MAE. (1999). Squamous cell carcinoma and keratoacanthoma of the lower lip associated with “Goza” and “Shisha” smoking. *International Journal of Dermatology* 38:108-110.

Fikri M, and Abi Saab BH. (2002). Global Yough Tobacco Survey: United Arab Emirates Report. The Central Health Education Department, Preventive Medicine Sector, Ministry of Health, Abu Dhabi, U.A.R.

Gadall A, Aboul-Fotouh A, El-Setouhy M, et al. (2003). Prevalence of smoking among rural secondary school students in Qualyobia Governorate. *Journal of Egyptian Social Parasitology* 33:1031-50.

Gangloff, M. (2004). Blacks burg gets a whiff of hookah experience. *Roanoke Times & World News*, March 19.

Global Youth Tobacco Survey Collaborative Group. (2002). Tobacco use among youth: a cross-country comparison. *Tobacco Control* 11:252-70.

Gunaid AA, Sumairi AA, Shidrawi RG, et al. (1995). Oesophageal and gastric carcinoma in the Republic of Yemen. *British Journal of Cancer* 71:409-410.

Gupta D, Boffeta P, Gaborieau V, et al. (2001). Risk factors of lung cancer in Chandigarh, India. *Indian Journal of Medical Research* 113:142-50.

Hadidi KA, and Mohammed FI. (2004). Nicotine content in tobacco used in hubble-bubble smoking. *Saudi Medical Journal* 25(7):912-17.

Heys, J. (2004). Health department bans hookahs at S.C. restaurant. Charleston (WV) Gazette, April 21.

Hillery L. (2005). Up in smoke. *Arizona Daily Wildcat*, February 22.

Hill-Rice, V, Weglicki L, Kulwicki A., et al. (2003). Arab American adolescent tobacco use (abstract). New Orleans, LA: Society for Research on Nicotine and Tobacco.

Inhorn MC, Buss KA. Ethnography, epidemiology and infertility in Egypt. *Social Science and Medicine* 39:671-86.

Israel E, Loffredo C, El-Setouhy M, et al. (2003). Egyptian smoking prevention research institute (ESPRI). *Journal of Egyptian Social Parasitology* 33:1009-17.

Israel E, El-Setouhy M, Gadalla S, Aoun el SA, Mikhail N, Mohamed MK. (2003) Waterpipe (Shisha) smoking in cafes in Egypt. *Journal of Egyptian Social Parasitology* 33(3):1073-85.

Jabbour S. (2003). Water-pipe (Hubble-Bubble) smoking: a research update and call to action. Helsinki: 12th World Conference on Tobacco or Health. 287.

Jabbour S, El-Roueiheb Z, Sibai AM. (2003). Narghile (water-pipe) smoking and incident coronary heart disease: a case control study. *Ann Epidemiology* 13:570.

Jaleel MA, Noreen R, Hameed A, et al. (2001) *Journal of Ayub Medical College Abbottabad* 13:33-35.

Kandela P. Signs of trouble for hubble-bubble. (1997) *Lancet* 349:9063.

Kandela P. Nargile smoking keeps Arabs in Wonderland. *The Lancet* 356(9236):1175.

Kinzer S. (1997). Narghile: inhale the pleasures of an unhurried Ottoman Past. *New York Times*, June 10.

Kiter G, Ucan ES, Ceylan E, et al. (2000). Water-pipe smoking and pulmonary functions. *Respiratory Medicine* 94:891-94.

Knishkowsky B and Amitai Y. (2005). Water-pipe (Narghile) Smoking: an emerging health risk behavior. *Pediatrics* 116(1): e113-e119.

Koch W. (2005). Hookah trend is puffing along. *USA Today*. December 28.

Kozlowski K. (2006). Hooked on hookahs: teens' waterpipe use raises health worries. *The Detroit News*, August 15.

Kugiya H. (2006). Hookah bars finding a place in America. Associated Press, December 31 (www.comcast.net/news/health/index).

Landphair T. (2003). Hookah bars become America's trendiest gathering places. *Voice of America News*, May 18.

Lewin, T. (2006). Collegians smoking hookahs...filled with tobacco. *New York Times*, April 19.

Lubin JH, Qiao YL, Taylor PR, et al. (1990). *Cancer Research* 50:174-80.

Lubin JH, Li JY, Xuan XZ, et al. (1992). Risk of lung cancer among cigarette and pipe smokers in Southern China. *International Journal of Cancer* 51:390-95.

Martell C. Hookahs: the ancient smoking devices aren't just for sultans anymore. Madison, WI: *Wisconsin State Journal*, June 3.

Maurer D. (2006). Hooked on hookahs. *New York Magazine* April 13.

Maziak W. Smoking in Syria. A profile of an Arab developing country. *International Journal of Tuberculosis and Lung Disease* 6:183-91.

Maziak W, Ward, KD, Afifi Soweid RA, and Eissenberg T. (2004). Tobacco smoking using a waterpipe: a re-emerging strain in a global epidemic. *Tobacco Control* 13:327-333.

- Maziak W, Fouad MF, Hammal F, et al. (2004) Prevalence and characteristics of narghile smoking among university students in Syria. *International Journal of Tuberculosis and Lung Disease* 8:882-89.
- Maziak W, Rastam S, Eissenberg T, et al. (2004). Gender and smoking status-based analysis of views regarding waterpipe and cigarette smoking in Aleppo, Syria. *Preventive Medicine* 38:479-84.
- Maziak W, Hammal F, Rastam S, et al. (2004). Characteristics of cigarette smoking and quitting among university students in Syria. *Prevention Medicine* 39:330-36.
- Maziak W, Eissenberg TE, Ward KD. (2004). Factors related to level of narghile use: the first insights on tobacco dependence in narghile users. *Drug and Alcohol Dependence* 76:101-06.
- McNicoll T. (2002). Hooked on Hookahs. *Newsweek International*, November 4.
- Miller, K. (2005). Hookah bar replaces cigar bar as new tobacco-driven hangout. *Knight Ridder News Service*, July 15.
- Mohamed MK, Gadalla S, Kato E, et al. (2003). Water-pipe (Goza) smoking among males in rural Egypt. New Orleans, LA: *Society for Research on Nicotine and Tobacco*.
- Munckhof WJ, Konstantinos A, Wamsley M., et al. (2003). A cluster of tuberculosis associated with use of a marijuana waterpipe. *International Journal of Tubercular Lung Disease* 7:860-65.
- Nafae A, Misra SP, Dhar SN, et al. (1973). Bronchogenic carcinoma in Kashmir Valley. *Indian Journal of Chest diseases* 15:285-95.
- Natto S, Baljoon M, and Bergstrom J. (2005). Tobacco smoking and periodontal health in a Saudi Araban population. *Journal of Periodontology* 76(11): 1919-1926.
- New York Times. (2006). Collegians puffing hookahs – of tobacco. Reprinted in the *St. Louis (MO) Post-Dispatch*, May 7.
- Nieburg, P., Marks JS, McLaren NM, et al. (1985). The fetal tobacco syndrome. *Journal of the American Medical Association*. 253:2998-99.
- Nuwayhid IA, Yarmout B, Azar G, et al. (1998). Narghile (hubble-bubble) smoking, low birth weight, and other pregnancy outcomes. *American Journal of Epidemiology* 148:375-83.
- Oliver C. Iran seeks to extinguish hubble-bubble pipes. 2004. (Available at www.mapinc.org/drugnews/v04.n905.a01.html).
- O'Malley, M. (2000). Hookah Smoke Links Cleveland to Mideast/Arabs Breathe Life into Old Customs. Cleveland, OH: *Plain Dealer*, September 10.
- Patel V. (2006). 'The lighter side' of Mid East culture. *The Rocky Mountain Collegian* June 6.

Philpot SJ, Ryan SA, Torre LE, Wilcox HM, Jalleh G, Jamrozik K. (1999) Effect of smoke-free policies on the behavior of social smokers. *Tobacco Control* 8:278-281.

Poland B, Frohlich K, Haines RJ. (2006). The social context of smoking: the next frontier in tobacco control? *Tobacco Control* 15:59-63.

Primack BA, Aronson JD, and Agarwal, AA. Z92006). An old custom: a new threat to tobacco control.(Letter). *Journal of the American Public Health Association* 96(8):1339.

Prokhorov A, Winickoff JP, Ahluwalia JS, et al. (2006). Youth tobacco use: a global perspective for child health clinicians. *Pediatrics* 118(3): 890-903.

Putnam D. (2001). Out there: hooked on hookahs. Framingham, MA: *Metro West Daily News*, November 22.

Radwan GN, Mohamed MK, El-Setouhy M, et al. Review on waterpipe smoking. *Journal of Egyptian Social Parasitology* 33:1051-71.

Rakower J and Fatal B. (1962). Study of narghile smoking in relation to cancer of the lung. *British Journal of Cancer* 16:1-6.

Rastam S Ward KD Eissenberg T and Maziak W. (2004). Estimating the beginning of the waterpipe epidemic in Syria. *BMC Public Health* 4:32.

Sajid KM, Akhter M, Malik CQ. (1993). Carbon monoxide fractions in cigarette and hookah (hubble-bubble) smoke. *Journal of the Pakistani Medical Association* 43:179-82.

Salem ES and Sami A. (1974) Studies on pulmonary manifestations of goza smokers. *Chest* 65:599.

Salem ES and Abdel-Latif A. (1974). Physical and Physiologic studies [sic] the etiogenesis of chronic airway obstruction in Goza smokers. *Egyptian Journal of Chest Disease and Tuberculosis* 17:7.

Shafagoj YA and Mohammed FI. (2002). Levels of maximum end-expiratory carbon monoxide and certain cardiovascular parameters following hubble-bubble smoking. *Saudi Medical Journal* 23:953-58.

Shafagoj YA, Mohammed FI, Hadidi KA. (2002). Hubble-bubble (waterpipe) smoking: levels of nicotine and cotinine in plasma, saliva and urine. *International Journal of Clinical Pharmacology and Therapeutics* 40(6):249-55.

Shihadeh A. (2003). Investigation of mainstream smoke aerosol of the argileh waterpipe. *Food and Chemical Toxicology* 41:142-52.

Shihadeh A, Azar S, Antonios C, and Haddad A. (2004). Towards a topographical model of narghile water-pipe café smoking: a pilot study in a high socioeconomic status neighborhood of Beirut, Lebanon. *Biochemistry, Pharmacology, and Behavior* 79(1):75-82.

Shihadeh A and Saleh R. (2005) Polycyclic aromatic hydrocarbons, carbon monoxide, “tar”, and nicotine in the mainstream smoke aerosol of the narghile waterpipe. *Food and Chemical Toxicology* 43(5):655-661.

Spear P. (2005). Harmful hookahs lure a young crowd. *Contra Costa Times* (July 15).

Taha A, and Ball K. (1982) Smoking in Africa: the coming epidemic. *World Smoking Health* 7:25-30.

Tamim H, Musharrafieh U, El Roueiheb Z, et al. (2003). Exposure of children to environmental tobacco smoke (ETS) and its association with respiratory ailments. *Journal of Asthma* 40:571-76.

Tamin H, Terro A, Kassem H, et al. (2003) Tobacco use by university students, Lebanon, 2001. *Addiction* 98:933-939.

Trout M. (2003). Hookahs. *BBC Online*. www.bbc.co.uk/dna/h2g2/A987825

Turkish Daily News. (1997). Nargile – a tradition comes to pass. March 3.

Varsano S, Ganz I, Eldor N, and Garenkin M. (2003). Water-pipe tobacco smoking among schoolchildren in Israel: frequencies, habits, and attitudes. *Harefuah* 142:736-41.

Ward KD, Eissenberg T, Rastam S, Asfar T, et al., (2006). The tobacco epidemic in Syria. *Tobacco Control* 15:24-29.

Ward KD, Hammal F, Vander Weg MW, et al. Are waterpipe users interested in quitting? *Nicotine and Tobacco Research* 7(1):149-56.

Ward KD, Vander Weg MW, Relyea G, et al. (2006). Waterpipe smoking among American military recruits. *Preventive Medicine* (43(2): 92-97.

Washington Times (2004). Hookahs emerge as oasis for NYC smokers. *Washington Times* February 3.

Wewers ME, Uno M. (2002). Clinical interventions and smoking ban methods to reduce infants' and children's exposure to environmental tobacco smoke. *Journal of Obstetrical, Gynecological, and Neonatal Nursing* 31:592-98.

WHO Study Group on Tobacco Product Regulation (TobReg) (2005). Waterpipe Tobacco Smoking: Health Effects, Research Needs and Recommended Actions by Regulators. Advisory Note.

Wikipedia. (accessed 2007). Hookah. <http://en.wikipedia.org/wiki/Hookah>.

Wolfram RM, Chehne F, Oguogho A, et al. (2003). Narghile (waterpipe) smoking influences platelet function and (iso-) eicosanoids. *Life Science* 74:47-53.

Yadav JS and Thakur A. (2000). Genetic risk assessment in hookah smokers. *Cytobios* 101:101-13.

Young, D. (2003) Hooked on hookahs: New Yorkers trade one vice for another. *New York Daily News* August 10.

Zahran FM, Ardawi MSM, Al-Fayez SF. (1985) Carboxyhaemoglobin concentrations in smokers of sheesha and cigarettes in Saudi Arabia. *British Medical Journal* 291:1768-70.

Zahran F, Yousef AA, Baig MHA. A study of carboxyhaemoglobin levels in cigarette and sheesha smokers in Saudi Arabia. *American Journal of Public Health*, Volume 72; Issue 7: 722-724

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Reducing Hookah Use

A Public Health Challenge
For the 21st Century



Creating A Tobacco Free Generation

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